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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
STAICOVICI, STEFAN	
ART UNIT	PAPER NUMBER
1732	19

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/851,242	RUNKLE ET AL.	
	Examiner	Art Unit	
	Stefan Staicovici	1732	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *08 September 2003* .

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2 and 4-28* is/are pending in the application.

4a) Of the above claim(s) *6-15* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-2, 4-5 and 16-28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *July 27, 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other:

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on September 8, 2003 has been entered.

Response to Amendment

2. Applicants' amendment filed September 8, 2003 (Paper No. 18) has been entered. Claims 1 and 16 have been amended. New claims 21-28 have been added. Claim 3 has been canceled. Claims 1-2 and 4-28 are pending in the instant application.

Election/Restrictions

3. Pursuant to the election made in the amendment filed December 23, 202 (Paper No. 9), claims 6-15 remain withdrawn from consideration without prejudice to Applicants filing one or more divisional applications.

Claim Objections

4. Claims 20 and 28 are objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to

cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6. Claims 1-2, 4-5 and 19-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mancusi *et al.* (US Patent No. 5,186,832) in view of Bikson *et al.* (US Patent No. 4,800,019).

Mancusi *et al.* ('832) teach the basic claimed process of making a hollow fiber membrane separation device (contactor) including, providing a core, wrapping a hollow fiber fabric onto said core (winding), potting the fabric and the core together to form an assembly (first potting), placing the assembly in a housing (shell) and potting the assembly and the housing interior to form a cartridge (second potting) (see col. 8, lines 44-48, col. 9, lines 1-7 and 60-68 and col. 9, lines 41-60). Further, it should be noted that Mancusi *et al.* ('832) specifically teach potting of the tube-sheets to the interior of the housing (see col. 9, lines 22-27). Furthermore, Mancusi *et al.* ('832) teach that the potting between the fabric and the core occurs by putting down continuous resinous potting material lines (bead-potting) (see col. 10, lines 45-50).

Regarding claims 1 and 20, although Mancusi *et al.* ('832) teach a second potting step, Mancusi *et al.* ('832) do not specifically teach mold potting. Bikson *et al.* ('019) teach a process

for forming a hollow fiber membrane contactor cartridge including, providing a mold, inserting the ends of a plurality of hollow fiber (3) bundles into the mold and injecting a resinous material into the mold to form tube-sheets (1) that are integral with the housing (see col. 4, lines 48-68). Therefore, it would have been obvious for one of ordinary skill in the art to have used mold potting as an alternative to gravity or centrifugal potting as taught by Bikson *et al.* ('019) in the process of Mancusi *et al.* ('832) because, Bikson *et al.* ('019) teach that mold potting is one of many equivalent procedures available to one ordinarily skilled in the art and also because, both references teach similar products and processes and solve the similar problem of potting in a process of making a hollow fiber membrane separation device (contactor). It is submitted that a space must exist between the exterior of the fiber bundles and, the mold and the housing, in order for the resin to penetrate between said spaces, such that mold potting occurs as described in the process of Mancusi *et al.* ('832) in view of Bikson *et al.* ('019).

In regard to claim 2, Mancusi *et al.* ('832) teach that the potting between the fabric and the core occurs by putting down continuous resinous potting material lines (bead-potting) (see col. 10, lines 45-50).

Specifically regarding claims 4 and 5, Mancusi *et al.* ('832) does not teach a step of heat-treatment, specifically a first and a second heat-treatment. Bikson *et al.* ('019) teach a process for forming a hollow fiber membrane contactor including, a first step of heat-treating to cure the potting resin and then a second step of heat treatment (see col. 4, line 60 through col. 5, line 7). Therefore, it would have been obvious for one of ordinary skill in the art to have heat-treated the hollow fiber membrane contactor as taught by Bikson *et al.* ('019) in the process of Mancusi *et*

al. ('832) because, Bikson *et al.* ('019) specifically teach that a two-step heat treatment process provides for an increased density of the porous walls of the hollow fibers, hence providing for an improved product (see col. 3, lines 27-42) also because, both references teach similar end-products.

Regarding claim 19, Mancusi *et al.* ('832) specifically teach a hollow fiber membrane separation device (contactor). It is submitted that the assembly (structure) is centered in the housing (shell) in order for the resulting hollow fiber membrane separation device (contactor) to function as described.

7. Claims 16-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mancusi *et al.* (US Patent No. 5,186,832) in view of Bikson *et al.* (US Patent No. 4,800,019) and in further view of Caskey *et al.* (US Patent No. 4,961,760).

Mancusi *et al.* ('832) in view of Bikson *et al.* ('019) teach the basic claimed process as described above.

Regarding claims 16-18, although Mancusi *et al.* ('832) teach "resinous potting materials" (see col. 9, lines 10-12), Mancusi *et al.* in view of ('832) Bikson *et al.* ('019) do not teach specific materials. Caskey *et al.* ('760) teach a process for making a hollow fiber membrane separation device (contactor) including, using a variety of materials as potting materials such as: epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic). Therefore, it would have been obvious for one of ordinary skill in the art to have used a variety of potting materials such as, epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic) as taught by Caskey *et*

al. ('760) in the process of Mancusi *et al.* ('832) in view of Bikson *et al.* ('019) because, Mancusi *et al.* ('832) specifically requires "resinous potting materials" (see col. 9, lines 10-12) and also because all references teach a hollow fiber membrane separation device (contactor), hence a similar end-product.

8. Claims 1-2, 4-5, 16, and 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang *et al.* (US Patent No. 5,284,584) in view of Mancusi *et al.* (US Patent No. 5,186,832) and in further view of Bikson *et al.* (US Patent No. 4,800,019).

Huang *et al.* ('584) teach the basic claimed process for making a hollow fiber membrane separation device (contactor) including, providing a core, wrapping a hollow fiber fabric onto said core and potting the fabric and the core together to form an assembly (see col. 15, line 57 through col. 16, line 26). Further, Huang *et al.* ('584) teach bead-potting (see Figure 1).

Regarding claim 1, Huang *et al.* ('584) do not teach forming a cartridge. Mancusi *et al.* ('832) teach a process for making a hollow fiber membrane separation device (contactor) including, providing a core, wrapping a hollow fiber fabric onto said core, potting the fabric and the core together to form an assembly, placing the assembly in a housing (shell) and potting the assembly and the housing interior to form a cartridge (see col. 8, lines 44-48, col. 9, lines 1-7 and 60-68 and col. 9, lines 41-60). Further, it should be noted that Mancusi *et al.* ('832) specifically teach potting of the tubesheets to the interior of the housing (see col. 9, lines 22-27). Furthermore, Mancusi *et al.* ('832) teach that the potting between the fabric and the core occurs by putting down continuous resinous potting material lines (bead-potting) (see col. 10, lines 45-50). Therefore, it would have been obvious for one of ordinary skill to have inserted a hollow

fiber membrane device into a casing and potted said hollow fiber membrane device to said casing as taught by Mancusi *et al.* ('832) in the process of Huang *et al.* ('584) because, Huang *et al.* ('584) specifically teach a hollow fiber membrane fabric used in separation devices, whereas Mancusi *et al.* ('832) teach a hollow fiber membrane separation devices and as such, the hollow fiber membrane fabric of Huang *et al.* ('584) requires to be inserted into a casing and potted to said casing as taught by Mancusi *et al.* ('832) in order to function as described.

Further regarding claim 1 and in regard to claim 20, although Mancusi *et al.* ('832) teach a second potting step, Huang *et al.* ('584) in view of Mancusi *et al.* ('832) do not specifically teach mold potting. Bikson *et al.* ('019) teach a process for forming a hollow fiber membrane contactor cartridge including, providing a mold, inserting the ends of a plurality of hollow fiber (3) bundles into the mold and injecting a resinous material into the mold to form tube-sheets (1) that are integral with the housing (see col. 4, lines 48-68). Therefore, it would have been obvious for one of ordinary skill in the art to have used mold potting as an alternative to gravity or centrifugal potting as taught by Bikson *et al.* ('019) in the process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) because, Bikson *et al.* ('019) teach that mold potting is one of many equivalent procedures available to one ordinarily skilled in the art and also because, all references teach similar products and processes and solve the similar problem of potting in a process of making a hollow fiber membrane separation device (contactor). It is submitted that a space must exist between exterior of the fiber bundles and, the mold and the housing, in order for the resin to penetrate between said space, such that mold potting occurs as described in the

process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019).

In regard to claim 2, Huang *et al.* ('584) teach bead-potting (see Figure 1). Mancusi *et al.* ('832) teach that the potting between the fabric and the core occurs by putting down continuous resinous potting material lines (bead-potting) (see col. 10, lines 45-50).

Specifically regarding claims 4 and 5, Bikson *et al.* ('019) teach a process for forming a hollow fiber membrane contactor including, a first step of heat-treating to cure the potting resin and then a second step of heat treatment (see col. 4, line 60 through col. 5, line 7). Therefore, it would have been obvious for one of ordinary skill in the art to have heat-treated the hollow fiber membrane contactor as taught by Bikson *et al.* ('019) in the process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) because, Bikson *et al.* ('019) specifically teach that a two-step heat treatment process provides for an increased density of the porous walls of the hollow fibers, hence providing for an improved product (see col. 3, lines 27-42) also because, both references teach similar end-products.

Regarding claims 16 and 18, Huang *et al.* ('584) teach a thermoplastic polyolefin as a potting material (see col. 11, lines 32-47).

In regard to claim 19, Huang *et al.* ('584) specifically teach a hollow fiber membrane fabric used in separation devices, whereas Mancusi *et al.* ('832) teaches hollow fiber membrane separation devices. It is submitted that the assembly (structure) is centered in the housing (shell) in order for the resulting hollow fiber membrane separation device (contactor) to function as

described in the process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019).

9. Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huang *et al.* (US Patent No. 5,284,584) in view of Mancusi *et al.* (US Patent No. 5,186,832) and in further view of Bikson *et al.* (US Patent No. 4,800,019) and Caskey *et al.* (US Patent No. 4,961,760).

Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019) teaches the basic claimed process as described above.

Regarding claim 17, Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019) do not teach an epoxy or a polyurethane potting material. Caskey *et al.* ('760) teach a process for making a hollow fiber membrane separation device (contactor) including, using a variety of equivalent materials as potting materials such as: epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic). Therefore, it would have been obvious for one of ordinary skill in the art to have used a variety of equivalent potting materials such as, epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic) as taught by Caskey *et al.* ('760) in the process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019) because, Mancusi *et al.* ('832) specifically requires "resinous potting materials" (see col. 9, lines 10-12) that are equivalent alternatives such as, epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic) and also because all references teach a hollow fiber membrane separation device (contactor), hence a similar end-product.

10. Claims 21-23 and 27-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mancusi *et al.* (US Patent No. 5,186,832) in view of Bikson *et al.* (US Patent No. 4,800,019) and in further view of Applicants' Admitted Prior Art.

Mancusi *et al.* ('832) teach the basic claimed process of making a hollow fiber membrane separation device (contactor) including, providing a core, wrapping a hollow fiber fabric onto said core (winding), potting the fabric and the core together to form an assembly (first potting), placing the assembly in a housing (shell) and potting the assembly and the housing interior to form a cartridge (second potting) (see col. 8, lines 44-48, col. 9, lines 1-7 and 60-68 and col. 9, lines 41-60). Further, it should be noted that Mancusi *et al.* ('832) specifically teach potting of the tube-sheets to the interior of the housing (see col. 9, lines 22-27). Furthermore, Mancusi *et al.* ('832) teach that the potting between the fabric and the core occurs by putting down continuous resinous potting material lines (bead-potting) (see col. 10, lines 45-50).

Regarding claims 21 and 28, although Mancusi *et al.* ('832) teach a second potting step, Mancusi *et al.* ('832) do not specifically teach mold potting. Bikson *et al.* ('019) teach a process for forming a hollow fiber membrane contactor cartridge including, providing a mold, inserting the ends of a plurality of hollow fiber (3) bundles into the mold and injecting a resinous material into the mold to form tube-sheets (1) that are integral with the housing (see col. 4, lines 48-68). Therefore, it would have been obvious for one of ordinary skill in the art to have used mold potting as an alternative to gravity or centrifugal potting as taught by Bikson *et al.* ('019) in the process of Mancusi *et al.* ('832) because, Bikson *et al.* ('019) teach that mold potting is one of many equivalent procedures available to one ordinarily skilled in the art and also because, both

references teach similar products and processes and solve the similar problem of potting in a process of making a hollow fiber membrane separation device (contactor). It is submitted that a space must exist between exterior of the fiber bundles and, the mold and the housing, in order for the resin to penetrate between said spaces such that mold potting occurs as described in the process of Mancusi *et al.* ('832) in view of Bikson *et al.* ('019).

Further regarding claims 21 and 28, Mancusi *et al.* ('832) in view of Bikson *et al.* ('019) do not teach a hollow fiber membrane having a diameter of at least 6 inches. However, Applicants' Admitted Prior Art teaches a hollow fiber membrane having a diameter of about 10 inches (see page 2, line 9 of the original disclosure). Therefore, it would have been obvious for one of ordinary skill in the art to have formed a hollow fiber membrane having a diameter of about 10 inches by using a center tube having a diameter of about 10 inches as taught by Applicants' Admitted Prior Art using the process of Mancusi *et al.* ('832) in view of Bikson *et al.* ('019) because, Applicants' Admitted Prior Art specifically teaches that such hollow fiber membrane are readily available whereas both Mancusi *et al.* ('832) and Bikson *et al.* ('019) teach a hollow fiber membrane separation device (contactor), hence a similar end-product.

Specifically regarding claims 22 and 23, Mancusi *et al.* ('832) in view of Applicants' Admitted Prior Art does not teach a step of heat-treatment, specifically a first and a second heat-treatment. Bikson *et al.* ('019) teach a process for forming a hollow fiber membrane contactor including, a first step of heat-treating to cure the potting resin and then a second step of heat treatment (see col. 4, line 60 through col. 5, line 7). Therefore, it would have been obvious for one of ordinary skill in the art to have heat-treated the hollow fiber membrane contactor as taught

by Bikson *et al.* ('019) in the process of Mancusi *et al.* ('832) in view of Applicants' Admitted Prior Art because, Bikson *et al.* ('019) specifically teach that a two-step heat treatment process provides for an increased density of the porous walls of the hollow fibers, hence providing for an improved product (see col. 3, lines 27-42) also because, all references teach similar end-products.

Regarding claim 27, Mancusi *et al.* ('832) specifically teach a hollow fiber membrane separation device (contactor). It is submitted that the assembly (structure) is centered in the housing (shell) in order for the resulting hollow fiber membrane separation device (contactor) to function as described.

11. Claims 24-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mancusi *et al.* (US Patent No. 5,186,832) in view of Bikson *et al.* (US Patent No. 4,800,019) and in further view of Applicants' Admitted Prior Art and Caskey *et al.* (US Patent No. 4,961,760).

Mancusi *et al.* ('832) in view of Bikson *et al.* ('019) in further view of Applicants' Admitted Prior Art teach the basic claimed process as described above.

Regarding claims 24-26, although Mancusi *et al.* ('832) teach "resinous potting materials" (see col. 9, lines 10-12), Mancusi *et al.* ('832) in view of Bikson *et al.* ('019) in further view of Applicants' Admitted Prior Art do not teach specific materials. Caskey *et al.* ('760) teach a process for making a hollow fiber membrane separation device (contactor) including, using a variety of materials as potting materials such as: epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic). Therefore, it would have been obvious for one of ordinary skill in the art to have used a variety

of potting materials such as, epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic) as taught by Caskey *et al.* ('760) in the process of Mancusi *et al.* ('832) in view of Bikson *et al.* ('019) in further view of Applicants' Admitted Prior Art because, Mancusi *et al.* ('832) specifically requires "resinous potting materials" (see col. 9, lines 10-12) that are equivalent alternatives such as, epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic) and also because all references teach a hollow fiber membrane separation device (contactor), hence a similar end-product.

12. Claims 21-24 and 26-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Huang *et al.* (US Patent No. 5,284,584) in view of Mancusi *et al.* (US Patent No. 5,186,832) and in further view of Bikson *et al.* (US Patent No. 4,800,019) and Applicants' Admitted Prior Art.

Huang *et al.* ('584) teach the basic claimed process for making a hollow fiber membrane separation device (contactor) including, providing a core, wrapping a hollow fiber fabric onto said core and potting the fabric and the core together to form an assembly (see col. 15, line 57 through col. 16, line 26). Further, Huang *et al.* ('584) teach bead-potting (see Figure 1).

Regarding claim 21, Huang *et al.* ('584) do not teach forming a cartridge. Mancusi *et al.* ('832) teach a process for making a hollow fiber membrane separation device (contactor) including, providing a core, wrapping a hollow fiber fabric onto said core, potting the fabric and the core together to form an assembly, placing the assembly in a housing (shell) and potting the assembly and the housing interior to form a cartridge (see col. 8, lines 44-48, col. 9, lines 1-7 and 60-68 and col. 9, lines 41-60). Further, it should be noted that Mancusi *et al.* ('832) specifically

teach potting of the tubesheets to the interior of the housing (see col. 9, lines 22-27). Furthermore, Mancusi *et al.* ('832) teach that the potting between the fabric and the core occurs by putting down continuous resinous potting material lines (bead-potting) (see col. 10, lines 45-50). Therefore, it would have been obvious for one of ordinary skill to have inserted a hollow fiber membrane device into a casing and potted said hollow fiber membrane device to said casing as taught by Mancusi *et al.* ('832) in the process of Huang *et al.* ('584) because, Huang *et al.* ('584) specifically teach a hollow fiber membrane fabric used in separation devices, whereas Mancusi *et al.* ('832) teach hollow fiber membrane separation devices and as such, the hollow fiber membrane fabric of Huang *et al.* ('584) requires to be inserted into a casing and potted to said casing as taught by Mancusi *et al.* ('832) in order to function as described.

Further regarding claim 21 and in regard to claim 28, although Mancusi *et al.* ('832) teach a second potting step, Huang *et al.* ('584) in view of Mancusi *et al.* ('832) do not specifically teach mold potting. Bikson *et al.* ('019) teach a process for forming a hollow fiber membrane contactor cartridge including, providing a mold, inserting the ends of a plurality of hollow fiber (3) bundles into the mold and injecting a resinous material into the mold to form tube-sheets (1) that are integral with the housing (see col. 4, lines 48-68). Therefore, it would have been obvious for one of ordinary skill in the art to have used mold potting as an alternative to gravity or centrifugal potting as taught by Bikson *et al.* ('019) in the process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) because, Bikson *et al.* ('019) teach that mold potting is one of many equivalent procedures available to one ordinarily skilled in the art and also because, all references teach similar products and processes and solve the similar problem of potting in a

process of making a hollow fiber membrane separation device (contactor). It is submitted that a space must exist between exterior of the fiber bundles and, the mold and the housing, in order for the resin to penetrate between said space such that mold potting occurs as described in the process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019).

Further regarding claims 21 and 28, Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019) do not teach a hollow fiber membrane having a diameter of at least 6 inches. However, Applicants' Admitted Prior Art teaches a hollow fiber membrane having a diameter of about 10 inches (see page 2, line 9 of the original disclosure). Therefore, it would have been obvious for one of ordinary skill in the art to have formed a hollow fiber membrane having a diameter of about 10 inches by using a center tube having a diameter of about 10 inches as taught by Applicants' Admitted Prior Art using the process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019) because, Applicants' Admitted Prior Art specifically teaches that such hollow fiber membrane are readily available whereas Huang *et al.* ('584), Mancusi *et al.* ('832) and Bikson *et al.* ('019) teach a hollow fiber membrane separation device (contactor), hence a similar end-product.

In regard to claims 22-23, Bikson *et al.* ('019) teach a process for forming a hollow fiber membrane contactor including, a first step of heat-treating to cure the potting resin and then a second step of heat treatment (see col. 4, line 60 through col. 5, line 7). Therefore, it would have been obvious for one of ordinary skill in the art to have heat-treated the hollow fiber membrane contactor as taught by Bikson *et al.* ('019) in the process of Huang *et al.* ('584) in view of

Mancusi *et al.* ('832) and in further view of Applicants' Admitted Prior Art because, Bikson *et al.* ('019) specifically teach that a two-step heat treatment process provides for an increased density of the porous walls of the hollow fibers, hence providing for an improved product (see col. 3, lines 27-42) also because, both references teach similar end-products.

Regarding claims 24 and 26, Huang *et al.* ('584) teach a thermoplastic polyolefin as a potting material (see col. 11, lines 32-47).

In regard to claim 27, Huang *et al.* ('584) specifically teach a hollow fiber membrane fabric used in separation devices, whereas Mancusi *et al.* ('832) teaches hollow fiber membrane separation devices. It is submitted that the assembly (structure) is centered in the housing (shell) in order for the resulting hollow fiber membrane separation device (contactor) to function as described in the process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019) and Applicants' Admitted Prior Art.

13. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Huang *et al.* (US Patent No. 5,284,584) in view of Mancusi *et al.* (US Patent No. 5,186,832) and in further view of Bikson *et al.* (US Patent No. 4,800,019), Applicants' Admitted Prior Art and Caskey *et al.* (US Patent No. 4,961,760).

Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019) and Applicants' Admitted Prior Art teach the basic claimed process as described above.

Regarding claim 25, Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019) and Applicants' Admitted Prior Art do not teach an epoxy or a polyurethane potting material. Caskey *et al.* ('760) teach a process for making a hollow fiber

membrane separation device (contactor) including, using a variety of materials as potting materials such as: epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic). Therefore, it would have been obvious for one of ordinary skill in the art to have used a variety of potting materials such as, epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic) as taught by Caskey *et al.* ('760) in the process of Huang *et al.* ('584) in view of Mancusi *et al.* ('832) and in further view of Bikson *et al.* ('019) and Applicants' Admitted Prior Art because, Huang *et al.* ('584) specifically requires "resinous potting materials" that are equivalent alternatives such as, epoxy (thermoset), polyurethane (thermoset and thermoplastic versions) and acrylic resins (thermoplastic) and also because all references teach a hollow fiber membrane separation device (contactor), hence a similar end-product.

Response to Arguments

14. Applicants' arguments filed September 8, 2003 (Paper No. 18) have been considered, but are drawn to newly presented claim limitations. As such, Applicant's arguments are moot in view of the new ground(s) of rejection.

Conclusion

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Stefan Staicovici, Ph.D. whose telephone number is (703) 305-

0396. The examiner can normally be reached on Monday-Friday 8:00 AM to 5:30 PM and alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael P. Colaianni, can be reached at (703) 305-5493. The fax phone number for this Group is (703) 305-7718.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Group receptionist whose telephone number is (703) 308-0661.

Stefan Staicovici, PhD

Primary Examiner

AU 1732

September 17, 2003